Introduction to Snowshoe Hiking

In a Nutshell

Students will discover the history and physics of snowshoes and experience firsthand how they work. Using one of *five* snowshoe hike themes, students will explore the refuge winter landscape. ***There must be at least 6 inches of snow in order to use snowshoes.***

Grade K-6
Season Winter
Location Visitor Center

Learning Objectives

After participating in this activity, students will be able to:

- demonstrate at least two of the following:
  how to put on / take off snowshoes; how to walk, turn around and get up from a fall in snowshoes; how to step over an obstacle; and how to side-step up and down a hill.
- explain how snowshoes make winter hiking easier.
- name at least four Minnesota animals that are adapted to traveling in the snow.

Literature Connections

The Snow Walker by Margaret K and Chales M. Wetterer
Beaver, Bear, Snowshoe Hare by Cheryl Dannenbring

Let's Go Snowshoeing! by Maureen Smith, Minnesota Conservation Volunteer magazine (www.dnr.state.us/young_naturalists/snowshoeing)
Hatchet by Gary Paulsen (1020L)
Brian's Winter by Gary Paulsen
Call of the Wild & White Fang by Jack London

On-site Activities

History, Function, and Nature of Snowshoes

Students will discover how and why snowshoes were used by Minnesota's historic peoples, as well as by today's biologists. Students will also learn how to identify three snowshoe shapes and design advantages of each shape. Students will connect the physics of snowshoes to adaptations of wildlife that are active during Minnesota snowy winters.

Students will be introduced to the "modern" snowshoe style they will use for their snowshoe hike, learning how to identify parts of a snowshoe. With guidance and observation, students will learn how to properly fit snowshoes and attach them to their boots. During the snowshoe hike, students will be introduced to techniques for walking and running, stopping and starting, turning, recovering from a fall, and maintaining balance and appropriate distance between classmates.

Snowshoe Hike Themes

Winter Wildlife Signs

Students will search for a variety of wildlife signs, including scat, tracks, scrapes, rubs, dens, nests and calls. When students return to the visitor center, they will record their observations on a poster. Students can take the poster back to their classroom to display. *This option works well for any audience, any age.*

"Insects in Winter" Bingo

Students will search for insect signs that match at least 5 pictures seen on the "bingo" card. These pictures are examples of insect signs and homes found throughout the refuge *This is a great option for*

students studying insects in the classroom, or for classes that have already conducted refuge insect studies or plan to later in the school year.

Winter SEEDS Scavenger Hunt

Students will search for the often overlooked winter seed heads of common and easily recognized prairie flowers. *This is a great option for students currently studying the prairie community, prairie plants or plant life cycles in the classroom or the refuge.*

Binocular Bird Hunt

With binoculars in hand, students will explore the winter landscape in search of birds that are designed to survive the harsh Minnesota winters. *This is a great option for students learning various ways animals deal with winter weather. This option is best for groups already experienced with binoculars or snowshoes.*

Winter Walker Relay Challenge!

Students will be challenged to a variety of physical obstacles and relay races on snowshoes! This option will test student speed and agility. Students will better understand the challenging interaction of chase and escape that predators and prey face in deep snow. They will also learn the importance of scientific protocol when comparing their event times with classes from other field trips. *This option is most appropriate for older students.*

Classroom Connection

Host a classroom, or grade level, snowshoe design contest. Ask each student to present a drawing (or small scale mock-up) of their unique snowshoe design. The presentation should include information about the materials they would use to build a "prototype", the type of terrain and size of a person their "prototype" would best accommodate, and an estimate of what it would cost to build this snowshoe design. Have students vote on the entries based on class established criteria, which should include how easy it is for a student to build.

Ask students to research an animal that is adapted to survive Minnesota's harsh winters. What special adaptations, beside broader snowshoe-like feet, help the animal to survive the harsh and long winter season? Assign students to teams to prepare a poster report of their findings.

Teacher Resources

Snowshoeing by Steven A. Griffin

Introduction to Snowshoe Hiking
Pre-Activity*

*NOTE: The activity may also be conducted at the refuge before the snowshoe hike. Please schedule at least a full 2-hour field trip if you prefer to incorporate the **"Let's Go Snowshoe Hiking!"** discussion and power point presentation into your refuge field trip.

Materials

- "Let's Go Snowshoe Hiking" PowerPoint slide show or photo examples of three different styles of snowshoes (bear paw, beaver tail, and modern) and photos of animals with built in snowshoe style feet (snowshoe hare, turkey, moose, lynx).
- Actual examples of modern and more traditional snowshoes
- Bio facts: turkey foot, deer hoof, snowshoe rabbit pelt.
- "What Do You Know About Snowshoe Hiking?" assessment-one per student (for first-time snowshoe hiking groups)
- Pencils- one per student

History and Physics of Snowshoes

*****For first time snowshoe hiking groups, pass out the "**What Do You Know About Snowshoe Hiking ?**" assessment. Read through and complete one question at a time with younger students to assure they understand the question and how to select an answer. Emphasize to students that there are no RIGHT or WRONG answers. Each student must write his/her name on the quiz. Collect the papers. After the field trip hike, pass the papers back to each student, being careful to match each student to their original paper, and ask them complete the post-activity side.*

Present the **"Let's Go Snowshoe Hiking!"** power point which highlights:

- How snowshoes were made in the past.
- The three main snowshoe designs.
- How different designs are advantageous for travel through different habitats.

- How today's snowshoe designs are different compared to snowshoes from the past.
- The terminology of snowshoe design.
- How biologists use snowshoes to access remote habitats.

Use the bio facts to illustrate some of the ways animals are adapted to snow as described in the power point script.

Introduction to Snowshoe Hiking
On Site-Activity

Materials

- One pair of snowshoes for each participating student, teacher, and class chaperone
- Leader tips and equipment based on the hike theme selected
- What Do You Know About Snowshoe Hiking assessment- from pre-activity, one per student
- Pencils- one per student

Introduction

Visitor Center (10 minutes)

Before arriving at the refuge, select a hike theme from the list which starts on page 7. Set-up the classroom based on the introduction activity suggested with the hike theme.

Upon arrival, welcome students to Minnesota Valley National Wildlife Refuge. Conduct a brief introduction to the hike theme as described. Review the associated journal page with the students.

Now review the parts of a snowshoe and demonstrate how to put on the snowshoes.

Putting on Snowshoes

Demonstrate for students how to properly put snowshoes on to boots. Teachers, make sure you have the attention of all the adult leaders in the group, as they will be helping students to put snowshoes on for the snowshoe hike. Emphasize the following, especially for the MCR brand:

- Snowshoes were not specifically designed to fit a left or right foot (like your shoes); however, the ankle straps should buckle on the outside of your foot. If a snowshoe feels loose, or comes off, this will make it easier to fix out on the trail because you will not be trying to work between your feet.

- The crampon, or ice claw, on the bottom of the snowshoe, will help you climb up and down hills in icy conditions. However, the crampon makes it easier to slip and slide on asphalt and carpeting. Students, when an adult is helping attach your snowshoes, stand up and place all your weight on the foot they are strapping. It may help to "think like a flamingo," standing on one leg. Adults, let students know it is alright to place a hand on your shoulder for balance.

- Make sure to adjust the straps as tightly as is comfortable. This will reduce the chance of the snowshoes popping off if a person on snowshoes falls. With the MCR brand, stretch the straps like a rubber band to get a snug fit. It also helps to pull the heel band as high as possible around the back of the ankle.

Snowshoe Hiking Basics

Outside (20 minutes)

When all students and adults are outside, get everyone moving quickly. Demonstrate the following techniques, one at a time, and ask the students to practice along with you.

- Walking vs. Shuffling

  Line-up students shoulder to shoulder for a walk race from one end of the field to the other end. During the race, if a student falls or runs, they will be considered "out". At the end of the race, point out to the group the students who picked-up their knees (in a sort of march) most likely moved the fastest and were less likely to trip. Illustrate how the snowshoe pivots to drop snow off the back of the shoe. This is especially important when the snow is deep and fluffy. Have the students repeat the race back to the other end of the field, and this time ask all the students to run.

- Backing Up vs. Turning

  Ask students to try walking backwards. Show the group how much easier it is to turn around than back up. Have the group practice a three-point turn in place. To do a three-point turn, lift right leg up and move it to the right side so that the foot is facing to the right. Next, lift the left leg to face the same direction. Repeat this move again going to the right. This will make a half turn and face the student in the opposite direction they began. Have students practice turning to the left as well.

- **Recovering from a Fall**
  Have students practice standing up from a fall. Show students how place their feet side by side, with one foot slightly in front of the other to ensure they do not stand on the tails of their snowshoes. Demonstrate how to grab onto the front of the snowshoe for leverage. Explain that this technique will be very helpful in the event a student may be in deep snow and unable to push up from the ground. To do this, the student should push his/her toe into the snow; this will make the cramp-on stay in place as the student puts all of his/her weight on the front of their foot to stand up.

- **Up and Down Hills**
  The crampon (ice claw), on the bottom on the snowshoe, will help prevent slipping when walking up and down hills. However, in very icy or steep conditions it is still good to use the side-step approach. Ask students to walk down or up the hill sideways. Position students parallel to the hill. Using one foot, students should step to the side and follow with the other leg. Have the students practice this technique both up and down a hill. Compare this with a straight downhill/uphill climb. Remind students to shift their weight forward as they go uphill and backward as they go downhill. Ask students which technique they prefer most.

- **Over a Hurdle**
  Demonstrate how to side-step OVER a hurdle, in the event students encounter an obstacle, such as a log, during their trail hike. Ask students to try this technique on any one of the hurdles set up in the field.

- **Proper Spacing between Hikers**
  Ask the entire class to line up behind you as you head out for the hike. After a few minutes on the trail, make a sudden and abrupt stop. Chances are likely the students have not provided enough space and will bump into each other like a line-up of dominoes. Ask students to take a look at their feet, and who is standing on another person's tails. Hold up your arms to illustrate how to properly space yourself from the others you are hiking with. If you can touch each other, you are too close. Spend the remaining time focusing on the selected hike theme.

Snowshoe Hike Theme Options

Outside (50 minutes)

Wildlife Walkers

This theme is most appropriate for Kindergarten audiences.
Students search for and them follow wildlife tracks to determine which of the 4 main walking patterns the animal uses: perfect walker, waddler, bounder, or hopper.

Classroom Pre-activity and Field Trip Introduction: Use the Animal Walking pattern classroom activity found in the *Who Goes There?* curriculum unit before coming out to the refuge. Show the "Introduction to Snowshoe Hiking" power point. When you reach the section of the power point that describes winter adaptations of common refuge wildlife, review the 4 main animal walking patterns with the students. Looking at each animal's body design and ask students to predict the animal's walking pattern. Encourage them to search for and identify these patterns during their snowshoe hike.

Winter Wildlife Signs

This theme is appropriate for all grade levels.
Students search for a variety of wildlife signs, including scat, tracks, scrapes, rubs, dens, nests and calls. When students return to the visitor center, they record their observations on a poster. Students can take the poster back to their classroom to display.

Field Trip Introduction: Gather an assortment of wildlife signs together from the 4 categories described on the student journal page: *Signs of Feeding*, *Tracks and Trails*, *Body Waste and Castoffs*, and *Nests and Shelters*. Place one set of signs in the center of the student table. Ask students to carefully examine the wildlife signs at their table. What do the signs all have in common? Ask the students at each table to share what they discovered. Create a list of sign categories on the board.

Insect Signs Bingo Hike

This theme is especially good for 2nd grade and those studying insects.
Students search for insect signs that match at least 5 pictures seen on the "bingo" card. These pictures are examples of insect signs and homes found throughout the refuge.

Field Trip Introduction: Gather an assortment of insect bio facts. Lead a class discussion on what happens to insects in the winter. Use the insect bio facts to illustrate some of signs insects leave behind. Include bark beetle galleries, wasp nests, a variety of galls, and moth cocoons.

I Spy….Winter SEEDS

This is an especially good for 3rd grade students and those studying prairie community, prairie plants, and plant life cycles.
Students search for the often overlooked winter seed heads of common and easily recognized prairie flowers.

Field Trip Introduction: With student input, draw the plant lifecycle that includes seeds. List on the board, with help from the students, the value of a seed too people, to plants and to wildlife. If needed, refer to the curriculum unit Seeds on the GO! for specific examples of the importance of seeds.

Winter Bird Hike

This is a great option for 4th grade students and those learning various ways animals deal with winter weather, animal communication, and bird watching.
Students explore the winter landscape in search of birds that are designed to survive the harsh Minnesota winters.

Field Trip Introduction: Ask students "Why do some birds migrate south in the winter and others do not?" Many people believe cold temperatures are the reason for bird migration. In fact, the insulating quality of feathers does protect birds from extreme winter temperatures. However, if birds can't find the food they are designed to eat, they will most definitely succumb to the winter weather. Make a list of birds that eat foods that would be

unavailable in the cold winter months. Examples would include birds that depend on open water to feed (i.e. ducks, kingfishers, and geese), those that feed on flying insects (i.e. blue birds, warblers and swallows) and nectar feeders (i.e. hummingbirds). Now make a list of foods that would be available. Seeds eaters (i.e. gold finches, chickadees, cardinals and blue jays) can find food throughout the winter. So can birds, like woodpeckers, that eat hibernating insects.

Winter Walker Relay Challenge!

This option is most appropriate for students in Grades 5 and above as it requires advanced coordination, balance and stamina.

Students will be challenged to a variety of physical obstacles and relay races on snowshoes. This option will test student speed and agility. Students will better understand the challenging interaction of chase and escape that predators and prey face in deep snow. They will also learn the importance of scientific protocol when comparing their event times with classes from other field trips.

Field Trip Introduction: There is no special introduction for this theme. Directions for the "events" start on page 10. There is however, a specific wrap up described on page 11-12.

Wrap Up

Classroom (5 minutes)

After returning from the snowshoe hike, pass out to students the "**What Do You Know About Snowshoe Hiking?**" assessment from the pre-activity. Carefully match each student to their original paper. Ask students to complete the post-activity side. Read through and complete one question at a time with younger age students to assure they understand the question and how to select an answer. Emphasize there is no RIGHT or WRONG answer. Collect the papers when students have completed the assignment. (This activity can also be completed back at school).

Remind students that they have learned a new winter recreational activity, snowshoeing. Snowshoeing is an activity students can do with their family and friends while visiting the refuge during the winter. Snowshoes are available for free loan to the public when the visitor center is open.

Winter Walker Relay Challenge!
Snowshoe Games

Materials

- Hula hoops (2)
- Orange Safety Cones (12)
- Bean Bags (4)
- 6" playground balls (2)
- Hurdles (6)
- Whistle (1)
- One pair of snowshoes for each participating student, teacher, class chaperone, and refuge volunteer
- One score sheet, clipboard, pencil, and stopwatch for each adult team leader
- Winter Walker Relay Challenge data set

Set-Up

Before the class arrives, Refuge staff will set-up 2 identical game courses with 6 safety cones spaced evenly between the start and end zones. One hula hoop will be placed over the start cone as the "base". Each student should start the relay with one snowshoe inside the hula hoop. All additional relay equipment will be placed at the start zone.

Divide the class into 2 equal teams each with an identified team captain. If the class can not be divided equally the team captain must run each rely twice. Ask students to decide a team name. Assign one adult (chaperone, volunteer, or teacher) to each team as the leader. Provide each team leader with a clipboard, event record sheet, and stopwatch. Select one leader to blow the start whistle. Play a second round, time permitting, of the relays the students find especially fun or difficult.

Event 1: Cone Racing

Line-up each team, single-file, behind the starting hoop. When the whistle is blown signaling the start, the first member in each team should race through the cones and back, then tag the next teammate in line, who will follow the same course. This should continue until all team members have completed the challenge. Team leaders should time this event and record the results on the data sheet.

Event 2: Bean Bag Toss

Line each team up, single-file, behind the starting line. Give the first student one bean bag. Demonstrate how they must walk while tossing and catching a bean bag in each hand.

At the start whistle, the first person in line must walk to the end while carefully tossing and catching the bean bag in the air. When the person reaches the end, they should loop around the cone marker and make their way back to the team. On the return route, the student does not have to toss and catch the bean bag.

Explain to students they will not be disqualified for dropping a bean bag; however, stopping to pick up a bean bag will affect the students time. The leaders, who are recording the team's time, should watch for students who are not tossing and catching the bean bag!

Event 3: Ball Catch Side-step

For this event, two members from each team will work together while racing against the other team. At the start whistle, the first two students in line will sidestep. When the whistle blows they will toss and catch a ball between each other, to the end cone marker, all while racing against the other team doing the same activity. When the teams reach the cone, have them repeat the ball catch as they sidestep back to the start line. Leader should record each team's finish times.

Remind students that teamwork is essential in this relay. Students will need to judge their partner's speed as well as their partner's height and strength when they toss the ball. A lot of time can be lost in the case of an overthrow!

To make this simpler, eliminate the side-step and instruct students to run along side the cones tossing the ball back between each other.

Note: If you do not have an even number of students, the last individual can forego the ball catch and simply sidestep (or run) to the end and back.

Event 4: Hula Hoop Hop Through

In this final event, pass out one hula hoop to each team. Demonstrate how to swing the hula hoop over your head, down toward your feet and then step through all while continuing down the course to the end cone. Now demonstrate how to walk (or run) the course, stopping to do the hula hoop hop through at each marker.

Emphasize to students that they should step through the hula hoop carefully and slowly so not to fall. They can make up their time racing to the next cone. A lot of time can be lost if they trip stepping through the hoop.

Students may either leave their hula hoop at the end and race back or continue the **Hula Hoop Hop Through** to the starting line. If it is decided to leave the hoop, the next student in line will have to race to the end marker, pick-up the hula hoop and do the **Hula Hoop Hop Through** all the way back.

Event 5: Hurdle Jump

Set-up three hurdles spaced equally along the course. At the start whistle, each team should send one member to run and jump through the course and back again. Leaders should record the team's finish time.

Wrap-Up

Collecting race times is similar to collecting any set of biological data and provides a great opportunity to introduce the concept of variables. In the design of science experiments, it is critical to identify and control as many variables as possible so that data collected can be reasonably compared and evaluated.

To help students understand variables provide them with the relay times for each team and each event. Ask them to make a bar graph that compares each set of relay times for each event. What might account for the differences in race times? With student input, make a list of possible variables in their *Winter Walker Relay Challenge* such as differences in student strength, speed, agility, and height.

Now incorporate the relay times from other teams that visited the refuge. Ask students to compare their class data to that of other schools. Are the differences in relay times between their own class and the other class(es) greater or smaller? What might account for this? With student input, make a list of new possible variables including temperature, snow conditions, and number of participants.

When two teams from the same class race against each other certain variables can be controlled. For example, the teams are adjusted to have the same number of students participating. The two teams race on the same day and at the same time which reduces weather variables. The same teacher is explaining the race to both teams so there is no difference in the way the race is conducted.

Conversely, a teacher that brings a class to the refuge on another day may experience completely different weather conditions, may have greater or fewer students participating, and might adjust the relay rules to better accommodate their own group. Is it reasonable (or fair) to compare data under these variables?

Ask students how they would plan a *Winter Walker Relay Challenge* between multiple teams at different schools to control as many of the variables they identified as possible.

Winter Walker Relay Challenge
Snowshoe Games Score Sheet

School:_____ Date:_____

Class:_____ #of Students:_____

Events (Round 1)	Team Name record each team's time to complete each relay game
Cone Racing	
Bean Bag Toss	
Ball Catch Sidestep	
Hula Hoop Hop Through	
Hurdle Jump	
Events (Round 2)	
Cone Racing	
Bean Bag Toss	
Ball Catch Sidestep	
Hula Hoop Hop Through	
Hurdle Jump	